

**Synopsis of the Montague Strait
Experimental Harvest Area 1985 - 1988**

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INTRODUCTION

This report documents fishing activity occurring in the Montague Strait Experimental Harvest Area from 1985 through 1988. The other pot shrimp harvest areas of Prince William Sound (Traditional Harvest Area and Eastern Harvest Area) are not covered by this report.

Spot shrimp (Pandalus platyceros) comprise over 95% of the total annual harvest in the management area. Small amounts of coonstripe (Pandalus hypsinotus) and pink (Pandalus borealis) are also harvested.

Prior to 1985, the entire Prince William Sound Management Area (Area E) was managed as one area. Management regulations such as guideline harvest range, and fishing season applied to all waters of the Management Area from Cape Suckling on the east to Cape Fairfield on the west.

The Alaska Board of Fisheries at the September 1984 meeting in Anchorage adopted a new management plan for Prince William Sound. This plan was unique in several aspects. The plan established three distinctive management areas within Prince William Sound. These were the Traditional Harvest Area, Montague Strait Experimental Harvest Area (MSEHA) and the Eastern Area (Figure 1). Two of these areas, Montague and Eastern, were designated as year-round fishing areas. Harvest was to be unregulated by the Department and therefore was dependent only upon effort and success.

As a condition of opening the MSEHA, the Board wanted to gain data on the effects of year-round fishing on the pot shrimp stock in that area. Vessel operators were required to submit a logbook with each fish ticket. A Commissioners permit was also required and was

issued to each vessel requesting one. Vessel operators were also required to notify the Department when they intended to leave the area. If vessels were registered for MSEHA they were not allowed to fish in the other areas until they relinquished their permit for MSEHA.

Four theories advanced by pot shrimp fishermen were instrumental in the Board of Fisheries authorization of the MSEHA. The first assumption stated that the waters of Montague Strait contained large quantities of spot shrimp which were not being harvested due to restrictive guideline harvest levels and seasons imposed by the Department. The second assumption stated that the Gulf of Alaska contained large reserves of spot shrimp and that these reserves would replenish the Sound, through migration, if excessive harvests occurred. Thirdly, catch rates would be approximately four times higher during the winter months, and lastly that unregulated fishing would not harm the stocks.

Section (e) of the Management Plan which outlined the Board's intent is as follows:

Regulation 5AAC 31.260 PRINCE WILLIAM SOUND POT SHRIMP FISHERY
MANAGEMENT PLAN

(e) in order to gain year-round fishery performance data from a moderately productive area, the Montague Strait Experimental Harvest Area is established and will remain open to fishing from January 1 through December 31 under terms of a permit issued by the Commissioner. Any harvest taken from the area during the spring and fall seasons will be included in the harvest guideline for the established fishing area. The board recognizes that the value of this experiment depends primarily on the data provided by fishermen. This will require that the information provided, including accurate and timely catch reporting through both fish

tickets and log books, be of a quality needed to evaluate the experiment. The Montague Strait Experimental Harvest Area is defined as those waters north of a line from Cape Cleare to Point Elrington, east of a line from Point Elrington to the southernmost tip of Latouche Island (59 56' N. lat., 148 02' W. long.) east of a line from Point Grace to Point Helen, and south of a line from the southern headland of Marsha Bay (60 19' N. lat., 147 40' W. Long.) to Graveyard Point.

RESULTS

The Montague Strait Experimental Harvest Area was open from January 1, 1985 to October 3, 1988 a total of three years and nine months. Total harvest during this time was 117,706 pounds. The largest annual harvest was taken during 1985 when 46,984 pounds was harvested by 18 vessels making 69 landings (Table 1). Harvest was nearly equal in 1986 when 46,347 pounds were taken by 15 vessels making 63 landings. The 1985 and 1986 seasons accounted for 79% of the total harvest.

Harvest and effort began to decline in 1987. The total harvest that year was 22,411 pounds taken by 12 vessels making 33 landings. The harvest continued to decline in 1988 when only 1,964 pounds were taken by four vessels which made four landings during the first nine months of the year.

Because of the wide variety of pot types, catch per unit of effort (CPUE) was measured in pounds per landing. The catch per landing by year also showed a decline from 1985 to 1988. In 1985 the CPUE was 681 pounds/landing. In 1986 and 1987 the CPUE was 735 and 679 pounds/landing. During 1988 the CPUE declined to 491

pounds/landing.

Landings were made each month during 1985. In 1986 the months of May and September had no landings. For 1987 no landings were recorded in September and October. In 1988 there were no landings during April, May, July, August and September.

Individual logbook data was reported in pounds/pot rather than pounds/landing. This logbook data indicate that fishing was improved during the winter months over the summer months. The lowest pot yields (pounds tails/pot) generally occurred during May through August (Table 2).

Although the MSEHA was designated as a year-round fishery the Department announced a closure on September 21, 1988 by Emergency Order # 2-S-E-06-88 which was effective on October 3, 1988. The justification for the closure was due to.

- 1) Decline in total annual harvests.
- 2) Decline in CPUE.
- 3) Conservation of the remaining pot shrimp resource.
- 4) Year-round harvest data was no longer being provided.

Commercial quantities of shrimp were not available through out the MSEHA, in fact most of the fishing was limited to waters around Green Island, the Needles and the eastern shore of Knight Island (Figure 2). Some vessels did explore the lower end of the Strait, however, very few pounds were produced from that area. There was never any indication that shrimp were moving in from the Gulf of Alaska.

The Department has reason to believe that some of the harvest data provided by fishermen was not accurate. On July 3, 1986 one vessel which regularly fished the area was issued a citation for having

baited pots in closed waters of the Traditional Harvest Area. The infraction occurred approximately five miles above the northern boundary of the MSEHA. This vessel was registered to fish in the MSEHA during this time. The defendant pleaded no contest and his pots were forfeited to the state.

The Department has also received reports from vessel operators that some vessels registered for the MSEHA were fishing in closed waters of Knight Island Passage which is in the Traditional Area. The Department was unable to substantiate these reports.

Table 3, gives the percentage of large females with eggs by month. Spot shrimp were generally without eggs during May, June, July and August. The Department has found this information useful to propose an adjustment for the fishing season in the Traditional Harvest Area.

CONCLUSIONS

Although the MSEHA did provide income to the participants of approximately \$370,000, the cost to the stock may be much higher. This experiment of year-round fishing was a departure from the Department's normal policy of not allowing unrestricted fishing on shellfish stocks. The pot shrimp stock in the MSEHA was not able to withstand continuous fishing pressure. Spot shrimp do not migrate long distances. This coupled with the fleet's ability to continuously remove animals, has resulted in the stock being over-harvested. Results from the Department's tagging program indicate that growth is relatively slow. The average growth for adult spot shrimp in Prince William Sound is approximately 3 millimeters (0.12 inch) per year in carapace length. Therefore, the area is expected

to remain depressed for the near future.

Results of fisheries during the past four years in the Traditional Harvest Area also suggest that the stock in this portion of Prince William Sound requires more conservative management. From 1985 to 1988 the Traditional Harvest Area sustained a harvest range of between 150,000 and 200,000 pounds. The Traditional Area also supported between 75 and 80 vessels annually. The Department has detected a decrease in stock size for the Traditional Harvest Area, however, this decrease is of smaller magnitude than that experienced in the Montague Strait Experimental Harvest Area. The Department is proposing changes to the fishing season to provide more stock protection in the Traditional Area.

Fishing on a year-round basis also disrupts sensitive life history events. Some of these events are molting, mating, and egg release. Unlike other Alaskan shellfish fisheries the pot shrimp fishery in Prince William Sound has not had regulations designed to insure that all animals are allowed to participate in breeding prior to removal. In Alaskan fisheries for crabs, which have separate sexes, females are prohibited and males are allowed the opportunity to participate in breeding at least once before removal. This is accomplished through a size limit on males. In pot shrimp fisheries, where individual shrimp reverse sex during their life, the size of animals harvested is determined largely by the marketplace and not on biological principles. This results in the taking of many small and medium size males who never transform to females and bear a clutch of eggs. Moreover, many individuals which do become females are harvested during the time when they are carrying the eggs. This type of fishery reduces the reproductive potential of the stock.

Based on the results of this experiment it is apparent the stock of shrimp in MSEHA has dramatically declined and currently is in

need of more protection. The MSEHA was not able to sustain production levels, or vessel effort. Unregulated fishing has greatly diminished the shrimp stock.

Reproductive potential of any stock needs to be maintained. There should be a balance between fishery removals and stock protection. The Department has used fishing seasons, and guideline harvest levels to provide protection to the stock in the Traditional Area. During the past four years there was no stock protection in the MSEHA.

Of the four theories originally proposed none appears true. There were spot shrimp available for harvest, however, there were no large quantities. No migration was detected from the Gulf of Alaska. Continuous fishing has harmed the reproductive potential of the stock. There is a trend of lower catch rates in the summer, however, the magnitude is not as large as originally proposed. Therefore the MSEHA should be put back into the Traditional Harvest Area and it should remain closed to commercial fishing at least through the spring 1990 season.

Table 1. Catch and effort in the Montague Strait Experimental Harvest Area by month, 1985-1988.

	1985			1986		
	Vessels	Landings	Pounds	Vessels	Landings	Pounds
Jan.	8	10	5,681	2	2	1,441
Feb.	10	13	7,784	5	9	6,979
March	10	12	6,824	6	7	7,314
April	2	2	2,179	3	3	3,956
May	1	1	1,470	0	0	0
June	3	5	2,116	4	5	1,553
July	4	10	3,302	5	14	5,911
Aug.	3	5	2,226	2	3	1,166
Sept.	1	1	810	0	0	0
Oct.	1	1	1,453	6	10	6,131
Nov.	1	1	1,561	7	8	11,216
Dec.	5	9	11,578	2	2	680
Total	18	69	46,984	15	63	46,347

	1987			1988		
	Vessels	Landings	Pounds	Vessels	Landings	Pounds
Jan.	2	2	3,435	1	1	381
Feb.	4	6	8,911	1	1	242
March	2	3	3,285	1	1	476
April	1	1	1,132	0	0	0
May	3	4	1,924	0	0	0
June	3	4	1,246	1	1	865
July	4	7	1,179	0	0	0
Aug.	3	4	799	0	0	0
Sept.	0	0	0	0	0	0
Oct.	0	0	0	--	--	closed
Nov.	1	1	324	--	--	closed
Dec.	1	1	176	--	--	closed
Total	12	33	22,411	4	4	1,964

Table 2. Catch per unit of effort (lbs tails/pot) from logbook data, MSEHA
1985-1988

	1985	1986	1987	1988	AVERAGE
January	0.47	0.81	0.79	---	0.69
February	0.52	0.68	0.92	0.34	0.62
March	0.59	0.44	0.95	---	0.66
April	0.68	0.71	0.98	---	0.79
May	0.62	---	0.28	---	0.45
June	0.50	0.48	0.23	---	0.40
July	0.47	0.31	0.26	---	0.35
August	1.05	0.36	0.24	---	0.55
September	1.46	0.44	---	---	0.95
October	1.12	0.49	---	---	0.81
November	0.86	0.74	0.22	---	0.61
December	0.90	0.38	1.23	---	0.84

Table 3. Percent of large shrimp with eggs by month, from logbook data
MSEHA, 1985 -1988.

	1985	1986	1987	1988	AVERAGE
January	52	67	38	---	52
February	56	67	43	10	44
March	44	60	46	---	50
April	3	44	30	---	26
May	1	---	1	---	1
June	0	1	0	---	1
July	2	1	1	---	1
August	17	2	17	---	12
September	40	90	---	---	65
October	68	82	---	---	75
November	68	76	90	---	78
December	72	60	43	---	58

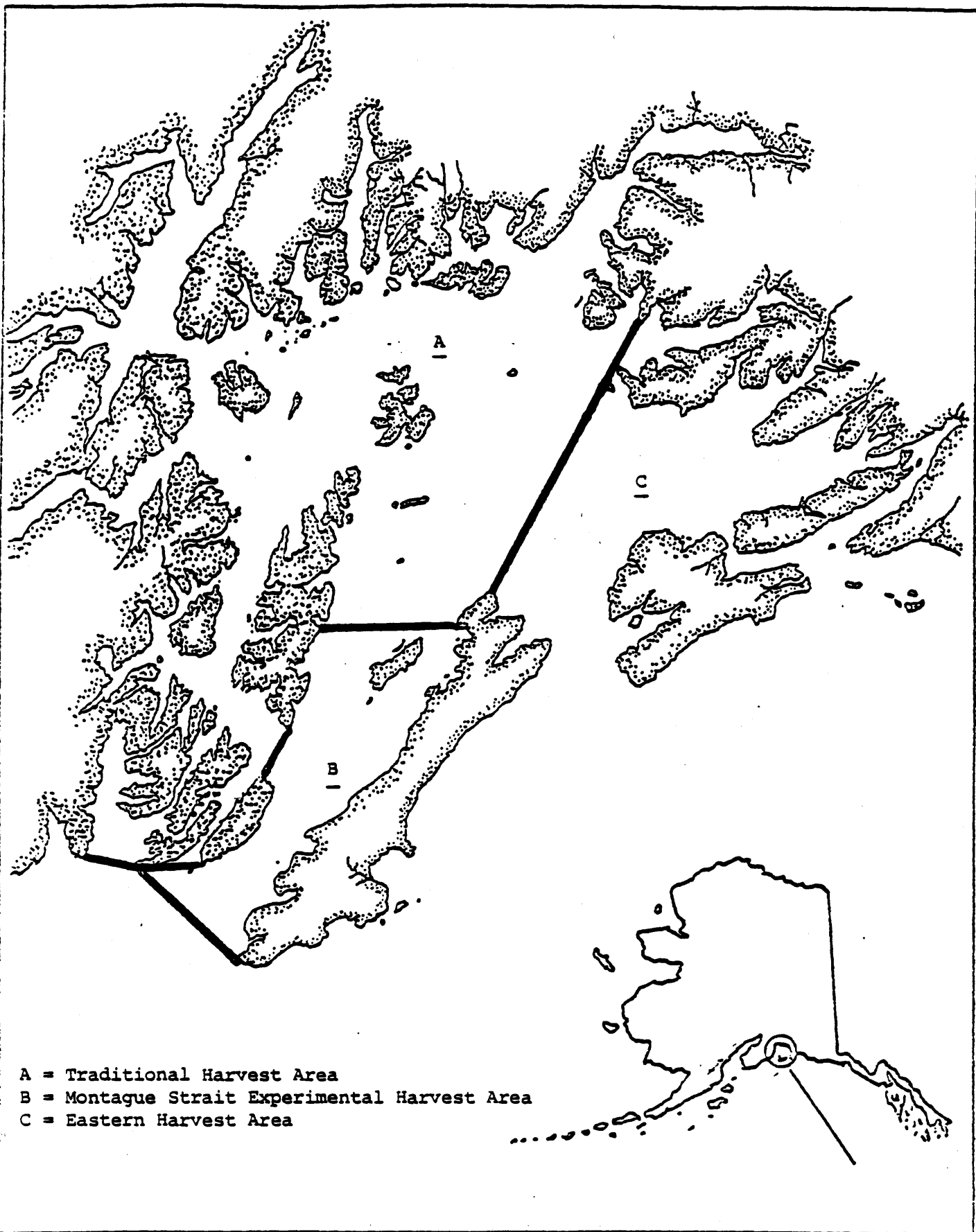


Figure 1. Pot Shrimp Harvest Areas, Prince William Sound.

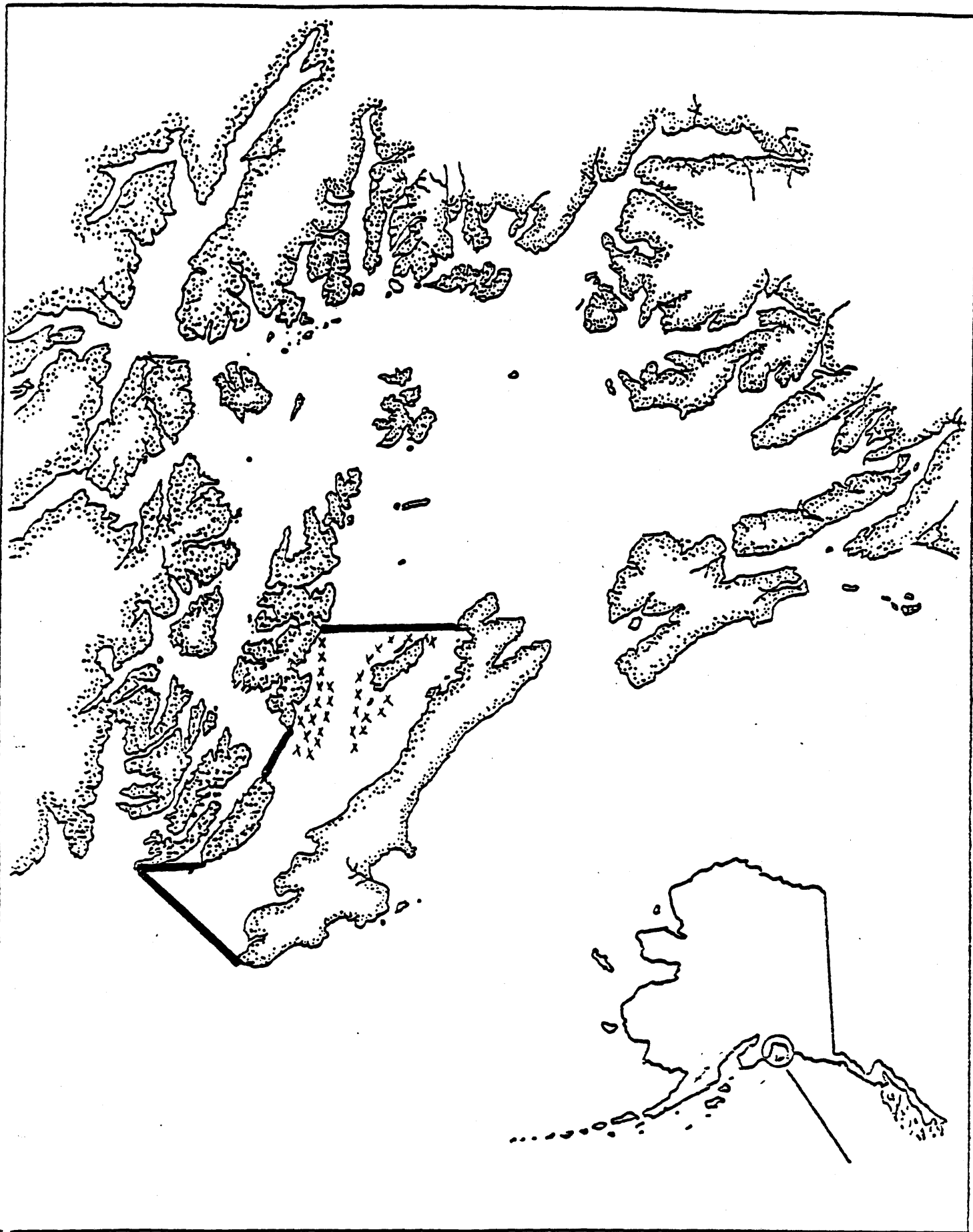


Figure 2. Montague Strait Experimental Harvest Area. Major spot shrimp harvest areas.

Appendix 1. Summation of logbook data by month from the Montague Strait
Experimental Harvest Area. All weights are tail weight.

1988							
	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
FEBRUARY	500	80	65	25	170	10	0.34
Total	500	80	65	25	170		
Month Avg	500	80	65	25	170	10	0.34
1987							
JANUARY	1688	430	355	605	1390	35	0.82
	1224	315	180	137	632	28	0.52
	245	153	122	120	395	50	1.61
	698	200	220	207	627	40	0.90
Total	3855	1098	877	1069	3044		
Month Avg	964	275	219	267	761	38	0.79
FEBRUARY	1221	360	151	162	673	23	0.55
	200	28	10	18	56	40	0.28
	1026	270	185	454	909	65	0.89
	1466	692	647	604	1943	45	1.33
Total	3913	1350	993	1238	3581		
Month Avg	978	338	248	310	895	43	0.92
MARCH	171	31	16	76	123	65	0.72
	200	32	20	18	70	40	0.35
	180	103	73	56	232	50	1.29
	306	159	101	129	389	30	1.27
Total	857	325	210	279	814		
Month Avg	214	81	53	70	204	46	0.95

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	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
APRIL	1327	504	369	423	1296	30	0.98
Total	1327	504	369	423	1296		
Month Avg	1327	504	369	423	1296	30	0.98
MAY	1580	210	70	89	369	2	0.23
	920	85	50	35	170	0	0.18
	1450	388	125	83	596	1	0.41
	940	140	45	35	220	0	0.23
Total	4890	823	290	242	1355		
Month Avg	1223	206	73	61	339	1	0.28
JUNE	590	80	55	10	145	0	0.25
	61	3	3	0.5	6.5	0	0.11
Total	651	83	58	11	152		
Month Avg	326	42	29	5	76	0	0.23
JULY	850	165	90	40	295	1	0.35
	160	55	35	9	99	3	0.62
	252	6	7	0	13	3	0.05
	810	95	35	20	150	0	0.19
	560	73	24	19	116	0	0.21
Total	2632	394	191	88	673		
Month Avg	526	79	38	18	135	1	0.26
AUGUST	183	19	18	2	39	10	0.21
	800	130	65	45	240	33	0.30
	1000	54	53	88	195	7	0.20
Total	1983	203	136	135	474		
Month Avg	661	68	45	45	158	17	0.24
NOVEMBER	920	65	36	97	198	90	0.22
Total	920	65	36	97	198		
Month Avg	920	65	36	97	198	90	0.22

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Appendix 1. (p. 3 of 9)

	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
DECEMBER	170	26	106	44	176	10	1.04
	812	437	303	289	1029	75	1.27
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Total	982	463	409	333	1205		
Month Avg	491	232	205	167	603	43	1.23

1986

JANUARY	140	25	20	4	49	60	0.35
	580	280	170	225	675	70	1.16
	126	19	96	70	185	50	1.47
	990	310	285	81	676	75	0.68
	536	127	98	120	345	80	0.64
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Total	2372	761	669	500	1930		
Month Avg	474	152	134	100	386	67	0.81
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FEBRUARY	1900	295	355	55	705	65	0.37
	630	325	170	230	725	80	1.15
	2090	462	364	443	1269	70	0.61
	458	115	104	126	345	75	0.75
	180	64	48	57	169	80	0.94
	393	150	165	90	405	75	1.03
	240	124	80	65	269	70	1.12
	658	190	140	75	405	75	0.62
	340	85	110	110	305	50	0.90
	280	125	75	110	310	30	1.11
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Total	7169	1935	1611	1361	4907		
Month Avg	717	194	161	136	491	67	0.68

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	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
MARCH	550	101	83	87	271	50	0.49
	425	116	182	168	466	50	1.10
	255	50	45	40	135	75	0.53
	1660	255	305	40	600	82	0.36
	556	135	115	100	350	80	0.63
	260	20	20	5	45	63	0.17
	2260	255	280	70	605	68	0.27
	447	37	41	50	128	50	0.29
	270	70	55	210	335	20	1.24

Total	6683	1039	1126	770	2935		
Month Avg	743	115	125	86	326	60	0.44

APRIL	1200	110	130	20	260	62	0.22
	135	6	11	19	36	50	0.27
	1290	455	385	725	1565	20	1.21

Total	2625	571	526	764	1861		
Month Avg	875	190	175	255	620	44	0.71

JUNE	456	50	90	29	169	1	0.37
	72	20	5	5	30	0	0.42
	230	90	20	10	120	1	0.52
	259	117	61	15	193	0	0.75
	825	248	105	23	376	1	0.46

Total	1842	525	281	82	888		
Month Avg	368	105	56	16	178	1	0.48

JULY	394	100	30	15	145	0	0.37
	300	97	38	5	140	0	0.47
	710	160	75	16	251	1	0.35
	542	100	94	74	268	1	0.49
	934	236	114	36	386	0	0.41
	3000	284	155	153	592	0	0.20
	383	125	35	20	180	0	0.47

-Continued-

Appendix 1. (p. 5 of 9)

	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
JULY							
	340	36	16	10	62	4	0.18
	488	105	54	8	167	0	0.34

Total	7091	1243	611	337	2191		
Month Avg	787	138	68	37	243	0	0.31

AUGUST							
	80	25	5	5	35	1	0.44
	480	85	30	50	165	5	0.34
	467	95	57	18	170	0	0.36

Total	1027	205	92	73	370		
Month Avg	342	68	31	24	123	2	0.36

SEPTEMBER							
	1080	73	122	275	470	90	0.44

Total	1080	73	122	275	470		
Month Avg	1080	73	122	275	470	90	0.44

OCTOBER							
	600	100	13	41	154	65	0.26
	1225	340	123	85	548	95	0.45
	418	86	57	40	183	85	0.44
	415	94	91	59	244	90	0.59
	880	130	85	40	255	65	0.29
	600	271	110	64	445	90	0.74
	1560	391	190	571	1152	80	0.74
	1475	295	195	30	520	85	0.35

Total	7173	1707	864	930	3501		
Month Avg	897	213	108	116	438	82	0.49

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	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
NOVEMBER	800	145	105	15	265	80	0.33
	460	106	65	34	205	98	0.45
	1690	335	330	65	730	85	0.43
	622	125	77	44	246	30	0.40
	1510	795	308	1787	2890	95	1.91
	2400	325	147	722	1194	70	0.50
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Total	7482	1831	1032	2667	5530		
Month Avg	1247	305	172	445	922	76	0.74
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DECEMBER	360	80	35	20	135	60	0.38
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Total	360	80	35	20	135		
Month Avg	360	80	35	20	135	60	0.38

1985

JANUARY	580	160	95	205	460	80	0.79
	132	33	25	23	81	50	0.61
	1205	275	90	61	426	30	0.35
	273	49	55	67	171	75	0.63
	582	275	111	37	423	44	0.73
	580	190	101	215	506	87	0.87
	427	85	65	65	215	55	0.50
	1002	239	149	0	388	40	0.39
	1200	99	84	164	347	80	0.29
	140	41	68	21	130	4	0.93
	450	22	35	0	57	30	0.13
	620	141	50	67	258	40	0.42
	192	35	35	0	70	30	0.36
	760	108	118	59	285	85	0.38
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Total	8143	1752	1081	984	3817		
Month Avg	582	125	77	70	273	52	0.47

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	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
FEBRUARY	1200	92	124	0	216	20	0.18
	560	126	42	68	236	65	0.42
	764	135	115	0	250	21	0.33
	120	40	20	20	80	85	0.67
	480	75	100	35	210	90	0.44
	200	15	35	20	70	10	0.35
	810	310	315	120	745	70	0.92
	890	560	65	30	655	35	0.74
	488	171	97	13	281	25	0.58
	276	39	33	25	97	75	0.35
	840	260	285	162	707	70	0.84
	640	35	76	0	111	15	0.17
	1200	133	74	152	359	80	0.30
	666	235	245	325	805	60	1.21
	560	84	36	45	165	60	0.29
	572	115	90	75	280	75	0.49
	750	153	90	168	411	95	0.55

Total	11016	2578	1842	1258	5678		
Month Avg	648	152	108	74	334	56	0.52

MARCH	580	30	100	65	195	10	0.34
	540	210	190	95	495	75	0.92
	400	57	57	30	144	70	0.36
	304	102	68	19	189	5	0.62
	480	27	19	52	98	70	0.20
	485	183	213	224	620	55	1.28
	1256	150	190	145	485	60	0.39
	370	40	65	45	150	50	0.41
	1045	140	225	170	535	3	0.51
	435	115	235	240	590	40	1.36

Total	5895	1054	1362	1085	3501		
Month Avg	590	105	136	109	350	44	0.59

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Appendix 1. (p. 8 of 9)

	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
APRIL	1440	220	235	280	735	3	0.51
	740	210	210	320	740	3	1.00
<hr/>							
Total	2180	430	445	600	1475		
Month Avg	1090	215	223	300	738	3	0.68
<hr/>							
MAY	210	60	60	100	220	3	1.05
	2040	390	190	300	880	0	0.43
	1025	375	180	370	925	1	0.90
<hr/>							
Total	3275	825	430	770	2025		
Month Avg	1092	275	143	257	675	1	0.62
<hr/>							
JUNE	1253	161	49	41	251	0	0.20
	240	40	15	5	60	0	0.25
	101	22	6	5	33	0	0.33
	545	459	155	110	724	1	1.33
<hr/>							
Total	2139	682	225	161	1068		
Month Avg	535	171	56	40	267	0	0.50
<hr/>							
JULY	404	52	11	15	78	0	0.19
	550	255	140	150	545	1	0.99
	500	127	24	18	169	0	0.34
	195	95	60	125	280	10	1.44
	303	50	25	15	90	5	0.30
	243	39	5	11	55	0	0.23
	170	40	15	10	65	0	0.38
	736	105	21	20	146	0	0.20
	480	114	86	40	240	1	0.50
<hr/>							
Total	3581	877	387	404	1668		
Month Avg	398	97	43	45	185	2	0.47

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Appendix 1. (p. 9 of 9)

	POTS/ LANDING	LBS. LARGE	LBS. MEDIUM	LBS. SMALL	TOTAL WT.	% LARGE WITH EGGS	CPUE LBS/POT
AUGUST	560	263	185	371	819	10	1.46
	320	39	12	11	62	1	0.19
	270	105	70	155	330	40	1.22

Total	1150	407	267	537	1211		
Month Avg	383	136	89	179	404	17	1.05

SEPTEMBER	120	75	30	70	175	40	1.46

Total	120	75	30	70	175		
Month Avg	120	75	30	70	175	40	1.46

OCTOBER	610	325	195	350	870	95	1.43
	90	31	24	43	98	70	1.09
	696	246	102	247	595	40	0.85

Total	1396	602	321	640	1563		
Month Avg	465	201	107	213	521	68	1.12

NOVEMBER	394	143	38	160	341	40	0.87
	204	45	50	30	125	90	0.61
	1070	240	77	262	579	50	0.54
	870	395	110	645	1150	90	1.32

Total	2538	823	275	1097	2195		
Month Avg	635	206	69	274	549	68	0.86

DECEMBER	430	205	65	380	650	90	1.51
	1812	375	265	566	1206	50	0.67
	102	26	30	15	71	90	0.70
	252	76	125	109	310	75	1.23
	124	46	45	75	166	80	1.34
	140	84	144	118	346	70	2.47
	1264	536	420	0	956	50	0.76

Total	4124	1348	1094	1263	3705		
Month Avg	589	193	156	180	529	72	0.90